other species, a full-grown male being hardly more than four feet long. It is probable that it is identical with one of the New Zealand Fur Seals, described by Dr. Gray as *Otaria cinerea*. If this should turn out to be the case, it will have a wider range than any of the others of the group.

There is certainly another species of Sea Lion on the coast of New Zealand, called Hooker's Sea Bear—*Otaria hookeri*. Its only certain habitat is the Aucklands. It is a large species, the males about six feet long, the females proportionately smaller. Though these New Zealand coasts and islands, together with the coasts of the mainland of Australia, have been visited and surveyed in every direction by English expeditions, no one has ever thought of preserving specimens for museums, so that we really know less about the seals of our colonies than we do about those of foreign coasts. Thus there is certainly a large species on the west coast of Australia, at the group of islands called Houtman's Abrolhos, described by Dr. Gray as *Neophoca lobata*. We are almost equally ignorant about the Sea Lions of the Cape of Good Hope. The species from that locality living in the Gardens—*Otaria pusilla*—is a very small one with an excellent fur. The Antarctic Sea Lion—*Otaria antarctica* (Gray)—is also from the Cape. This completes the number of species of Otarias, which may be thus tabulated :—

OTARIA

| | |
|---|---|
| *Pusilla*<br>*Antarctica* | from South Africa and the adjacent islands. |
| *Jubata*<br>*Falklandica* | from Cape Horn and the adjacent islands. |
| *Japonica*<br>*Stelleri*<br>*Ursina* | from the North Pacific. |
| *Hookeri*<br>*Lobata* | from Australia and New Zealand. |

In some respects intermediate between the Sea Lions and true Seals, is the Walrus, an animal with the head flattened in front, the upper lips with long stiff whiskers, the two enormous tusks, the short bull-like neck, and the vast carcase. Stuffed specimens err in being too distended and smooth, all the natural wrinkles being removed. The hair is thin and short. The attitude resembles in the main that of the Sea Bear, as do the limbs, the thumb being the longest digit, and the hind feet directed forward. There are no external ears, but a fold of skin above the auditory opening. The eyes, destitute of lashes, are deeply set. The tusks, developed in the female as well as in the male, never exceed twenty-six inches in length, including the imbedded root of six inches. The creature is omnivorous. It is becoming very scarce in its favourite haunts, on account of the indiscriminate way in which it is slaughtered. Upwards of 1,000 are still taken annually in the neighbourhood of Spitzbergen. Formerly it was found at Bear Island and on the coast of Finmark. It is still found on the east coast of Greenland, on the west shore of Davis' Straits, about Pond's, Scott's, and Howe Bays. In 1775 they resorted, to the number of over 7,000 a year, to the Magdalen Islands, at the mouth of the St. Lawrence, and the English once had a fishery at Cape Breton. It can be mentioned only as a straggler to our coasts.

Every part of the animal is of value—the tusks, the hide, and the flesh. The word *Walrus* means "Whale Horse," *Ross* being the Danish for a steed. *Morse* is Russian. The Greenlanders call it *Awük*, a name derived, it is said, from the cry of the young animal.

Seals are in a state of far less confusion than Sea Lions. The species are numerous, Dr. Gray recognising fourteen species and thirteen genera. As a basis for classification, the number of incisor teeth, together with the shape of the hands, leads to a very natural arrangement of the family. Following this, we find that four incisors above and four below unite the four Seals of the Southern Ocean with the Mediterranean Seal. The six northern species, again, have all six incisors above, and four below, their hands being like those of the "Bearded" and "Common" Seals. Lastly, four incisors above and two below separate off those very remarkable forms, the "Bladder Seal" of the north and the mighty "Sea Elephant" of the south, which have the further point in common of a remarkable development of the nasal passages. The Sea Leopard—or Leopards, if there are really two—together with the Crab-eating Seal, which ought most probably to be united in the same genus with them, inhabit the Antarctic Ocean. In the last-named species the molar teeth are remarkably modified.

The fourth Antarctic Seal is that called *Ommatophoca rossi*—Ross's Large-eyed Seal, known only from specimens procured from Sir J. Ross's Antarctic Expedition. The next species we come to is the Monk Seal (*Monachus albiventer*), which inhabits the Mediterranean and the Island of Madeira.

Of the "Hooded Seal," or "Bladder Nose," till a few days ago a fine male specimen was living in the Society's Gardens. The length attained ranges between seven and twelve feet. Though a true seal, it has the power of using the fore-feet to walk on land to a certain degree. The nose is broad and flat, and in the male the upper wall of the nostril is so loose that it can be blown up at will into a hood. The use of this curious appendage is not known. Its habits are migratory. It is found in South Greenland, rarely in Iceland and Norway, never now at Spitzbergen. The nearest ally to this seal is the "Sea Elephant," described by Anson in 1742, from Juan Fernandez. It has been recorded to be thirty feet long. The nostrils of the male are prolonged into the remarkable appendage which has been the origin of its name, "Proboscis Seal," the tubular proboscis being, when inflated, a foot in length.

Round the English coast there are two species of seals that are tolerably common, the Common Seal (*Phoca vitulina*) and the Great Grey Seal (*Phoca gryphus*). The former frequents both sides of the North Atlantic, Spitzbergen, Greenland, and Davis' Straits. The latter species is far rarer in this country. It is not found in Polar waters nor in the Mediterranean Sea, where the former exists. Further north we come to three other seals, the Bearded Seal (*P. barbata*), the Greenland Seal (*P. grœnlandica*), and the Ringed Seal (*P. hispida*); the two latter sometimes appear on our coasts as stragglers.

The lecturer concluded by remarking on the necessity for some international agreement to prevent the destructive effects of the short-sighted policy now adopted in seal-hunting.

(*To be continued.*)

## ON LIGHTNING FIGURES

THE letter headed "Struck by Lightning," and signed "D. Pidgeon," contained in NATURE, vol. xi. p. 405, is valuable, and the more so because it is unaccompanied by any theory. Formerly, when ramified marks appeared on the persons of men or animals, they were always referred to some near or distant tree, of which the marks formed "an exact portrait." Thus, in the *Times* of September 10, 1866, is an account of a boy who had taken refuge under a tree during a thunderstorm, having been struck by lightning, and on his body was found "a perfect image of the tree, the fibres, leaves, and branches being represented with photographic accuracy."

In a paper read by me before the British Association at Manchester in 1861, I attempted to show that such ramified figures are not derived from any tree whatever, but represent the fiery hand of the lightning itself. Very instructive tree-like figures may be produced on sheets of crown glass by passing over them the contents of a Leyden jar. For this purpose the plates (those I used were

four inches square) should be put into a strong solution of soap, and wiped dry with a duster. If a plate be then held by the corner against the knob of a small charged jar, and, with one knob of the discharging rod resting against the outer coating, the other be brought up to the knob of the jar with the glass between, the spark will pass over the surface of the pane, turn over its edge, and thus arrive at the knob of the rod. Nothing is visible on the plate until it is breathed on, and then the condensed breath settles in the form of minute dew on those parts of the soapy film that have not been burnt off by the electricity, while on the lines that have been burnt off or made chemically clean the moisture condenses in watery lines, bringing out the trunk, branches, and minute spray of the dendritic figure in a very perfect manner. In the discussion that followed the reading of my paper, the president of the section remarked that the figures exhibited would pass for trees all over the world. The discharge sometimes exhibits bifurcations and even trifurcations. The main trunk is evidently a hollow tube, as in the vitrified masses known as fulgurites, where lightning

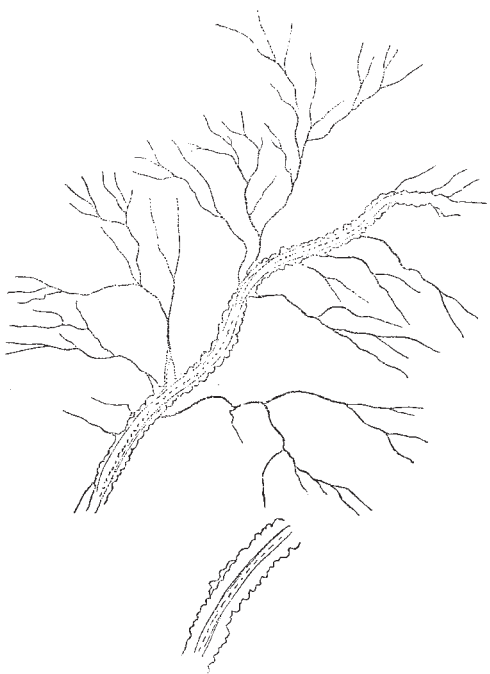

FIG. 1.—Breath Figure of Electric Discharge (also called *Roric Figure*, from *Ros-roris*, "dew.")

ploughs through a sandy soil. Should the plate be too thick, the main discharge may not pass, in which case the plate represents spray only. Hence I infer that the spray precedes the discharge and acts as a feeler for the line of least resistance. Indeed, it is an old observation of sailors, that before the ship was struck everyone on board felt as if cobwebs were being drawn over his face.

The accompanying (Fig. 1) is one of the figures produced as above described, the separate figure being an enlarged portion of the stem or trunk which represents the main discharge. Other examples may be found in the "English Cyclopædia" (Arts and Sciences division), article "Breath Figures," and in the *Edinburgh New Philosophical Journal* for October 1861.

After the reading of my paper I was anxious to see some examples that had been undoubtedly produced by lightning of these ramified figures. I was gratified by the receipt of a letter from Dr. Pooley, of Weston-super-Mare, informing me that he had actually seen a tree struck by lightning, that the inner surfaces of the detached bark contained ramified figures such as I had described, and that he had sent specimens to Dr. Faraday. I accordingly applied for permission to examine them. The figures on the bark had become very faint, but the following engraving (Fig. 2) represents their character.

In the *Lancet* of July 30, 1864, Dr. D. Mackintosh describes a case in which a straw stack was struck by lightning and set on fire, while a man who had sought its shelter was killed, and two boys injured. One of the boys, aged ten, said he felt "dizzy all over;" his legs would not carry him, and he felt pain in the lower part of the abdomen. On taking off his clothes a peculiar sulphurous singed odour was perpectible, and also several irregular but distinct red streaks, of about a finger's breadth, running obliquely downwards and inwards on either side of the chest to a middle line in front of the

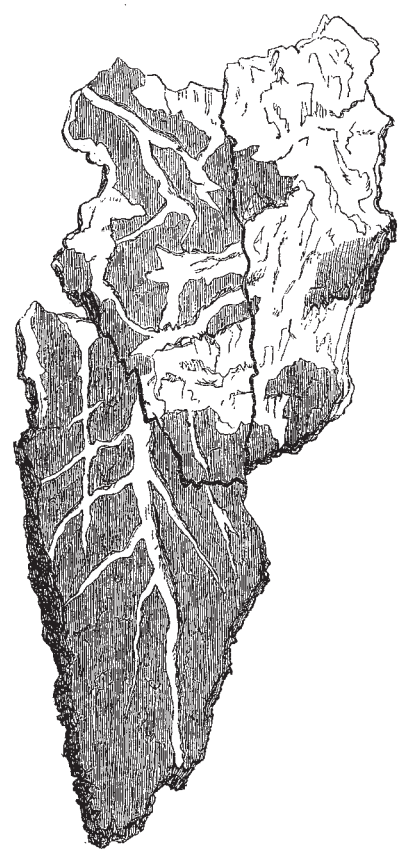

FIG. 2.—Three Portions of the Inner Surface of the Bark.

abdomen, whence they converged; from this point they diverged again till they were lost in the perineum. The streaks were of a brighter red on the more vascular parts of the body; they disappeared in about four days, and the lad recovered.

In the second case, that of a boy aged eleven, "the figures on either hip were so exceedingly alike and so striking, that an observer could not but be impressed with the idea that they were formed in obedience to some prevailing law."

In the third case, that of a man of forty-six, the discharge passed through the head, and seems to have produced instant death.

The phenomena in the case of the two boys agree very well with those described in Mr. Pidgeon's letter.

But there are various other figures produced by lightning sufficiently numerous to have led M. Baudin, in his

"Treatise on Medical Geography," to apply to them the term *Keraunography* (to write with thunder). Mr. Poey, in 1861, published a small volume in which twenty-four illustrative cases are cited. The author starts with the popular notion that the dendritic figures referred to are derived from some near or distant tree, and then proceeds to account for them by means of a photo-electric action in which the surface of the animal is the sensitive plate; the tree, &c., the object; and the lightning the force that impresses it.

But in connection with our subject are other facts, startling, it is true, but recurring from time to time in different parts of the world, and reported by sailors and others, who possess the invaluable art of recording their observations without attempting to explain them. The desire of explaining everything often amounts to a kind of rabies, when the sane course seems to be to wait; for if a reasonable theory is impossible, an unreasonable one is ridiculous. Nevertheless, some observers, if they cannot explain a fact, deny its truth; and yet such facts may exist in nature, and only wait the progress of discovery, when in due time they are gathered in under the sickle of the appointed reaper. Three such facts are the following:—

1. In September 1825, the brig *Il Buon Servo*, anchored in the Bay of Armiro, was struck by lightning, and a sailor who was sitting at the foot of the mizenmast was killed. Marks were found on his back, extending from the neck to the loins, including the impression of a horse-shoe, perfectly distinct, and of the same size as the one that was fixed to the mast.

2. In another case that occurred at Zante, the number 44 in metal was attached to the fixed rigging between the mast and the cot of one of the sailors. The mast was struck and the sailor killed. On his left breast was found the number 44, well formed and perfectly identical with that on the rigging. The sailors agreed that the number did not exist on the body before the man was struck.

3. M. José Maria Dau, of Havannah, states that in 1828, in the province of Candelaria, in the island of Cuba, a young man was struck by lightning, and on his neck was found the image "d'un fer à cheval qui avait été cloué à peu de distance contre une fenêtre."

Unexpected light was thrown upon such cases by Mr. C. F. Varley (Proc. Roy. Soc., Jan. 12, 1871), in following up an accidental observation during the working of a Holtz electrical machine, the poles of which were furnished with brass balls about an inch in diameter. Noticing some specks on the ball of the positive pole, Mr. Varley tried to wipe them off with a silk handkerchief, but in vain. He then examined the negative pole, and discovered a minute speck corresponding to the spots on the positive pole. This pole sometimes exhibits a glow, and if in this state three or four bits of wax, or even a drop or two of water, be placed on the negative pole, corresponding non-luminous spots appear on the positive pole. Hence it is evident that lines of force exist between the two poles, by means of which we may telegraph through the air from the negative to the positive pole. And in explanation of the above cases in which the lightning-burn on the skin is of the same shape as the object from which the discharge proceeded, all that is necessary is that the object struck be + to the horse-shoe, brass number, &c., the discharge being a negative one.

C. TOMLINSON

## *INAUGURATION OF THE ZOOLOGICAL STATION OF NAPLES*

AFTER the first working year a formal inauguration of this new institution took place on April 11. Dr. Dohrn had invited the Italian Minister of Public Instruction, Signor Borghi, and the German Ambassador at Rome, Herr von Kendell, to be present as representatives of the two countries which had most assisted in completing the new establishment, the one granting the locality, whilst the other paid a subvention of 3,000*l.* towards the expenses of the construction. Unfortunately both gentlemen were at the last moment prevented from being present, but sent two letters stating their great sympathy and the sympathy of the two Governments which they represent, for the Zoological Station.

The inauguration solemnity consisted chiefly in an inaugural address read by Dr. Dohrn himself to an audience of distinguished gentlemen, and a short answer given by Signor Paureri, the well-known Professor of Anatomy of the Naples University.

Before giving an abstract of the address, it may be permitted to say a few words about the life and work of the Zoological Station during the first year of its existence.

The following naturalists have made use of its laboratories:—From *England:* Mr. Balfour, Mr. Dew Smith, Mr. Marshall, from Cambridge; Mr. E. Ray Lankester, from Oxford. From *Holland:* Mr. Hubrecht (Leyden), Dr. Hoek (Haag), Prof. Hoffmann (Leyden), Dr. Hoorst (Utrecht), Prof. Van Ankum (Groningen). From *Germany:* Prof. Waldeyer (Strassburg), Prof. Wilh. Müller (Jena), Dr. Korsmann (Heidelberg), Prof. Hesslöhl (Constanz), Prof. Greeff (Marburg), Profs. Kollmann and Ranke (Munich), Dr. Steiner (Halle), Prof. Oscar Schmidt (Strassburg), Prof. Langer Lans (Freiburg), Dr. v. Thering (Göttingen), Dr. Götte and Dr. Lorent (Strassburg), Dr. Vetter (Dresden), Prof. Selenka (Erlangen). From *Austria:* Prof. Claus (Vienna) with two students of the Vienna University. From *Russia:* Prof. Salensky (Kazan), Dr. Rajewsky (Moscow), Dr. Bobretzky (Kiew), Dr. Ulianin (Moskau), Dr. Rosenberg (Dorpat), Cand. Isnoskoff (Kazan). From *Italy:* Dr. Cavanna (Florence), Dr. Fanzago (Padua), Dr. Zingone (Naples).

Some of these naturalists have been working a whole year in the Zoological Station; some have come back a second time; the greater number have only stayed the winter, especially from February till May, a period when the Station is likely to be visited more frequently than at any other.

If one compares the number of naturalists coming to Naples in former years to study Marine Zoology with the number of those who are named above, it is at once obvious how great an effect the Zoological Station has had on the increase. Formerly from three to five zoologists used to come during the year to Naples, often even less, or none. From Easter 1874 till Easter 1875, there were thirty-six naturalists, and during March and April of this year alone there have been working contemporaneously in the Zoological Station eighteen zoologists.

This shows how considerable in a quantitative point of view the increase of scientific work done at Naples has become. It is besides obvious that the arrangements in the Zoological Station—the great Aquarium providing almost natural conditions of life to the animals, the daily supply of fresh material, the facility offered by the library for consulting the literature, and the personal intercourse among so many scientific men,—must have also a favourable influence on the quality of the work, by enabling each of the naturalists to concentrate his energy solely on the scientific difficulties of his pursuit, not having at all to deal with any of the tiresome, very trying, and for a single man often almost insurmountable obstacles of a more practical character which are in the way of these studies.

Besides, one must not forget that the Zoological Station is still in its infancy, and has grown to its present state of working order in the midst of difficulties of every kind and character. Granted a greater experience in the line of its actions, especially a greater knowledge of the sea and its localities, currents, temperatures, and other conditions affecting the life and habitat of